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HIGHER DIMENSIONAL HYPERBOLIC GEOMETRY
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HIGHER-DIMENSIONAL HYPERBOLIC MANIFOLDS VIA COXETER POLYTOPES

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Hyperbolic manifolds (complete and finite-volume) exist in every dimension n. We know essentially two tools to construct them: the arithmetic techniques (which work for any n), and the more geometric Coxeter polytopes (which exist only for limited n). Each technique has its advantages and shortcomings. We will investigate here the second tool, namely Coxeter polytopes. These are polytopes whose dihedral angles divide π, and a particularly useful class consists of the right-angled ones: these can be used to build plenty of interesting hyperbolic manifolds in all the dimensions $n \leq 8$.

The minicourse consists of two main parts. Part one is an overview about these manifolds and actions as well as results of local rigidity of actions with high regularity or of rank one groups. In part two, we focus on the situation when the actions are of low regularity and are of higher rank groups.